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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/987,402	11/14/2001	Shigeru Saotome	Q67281	7038

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EXAMINER

UPRETI, ASHUTOSH

ART UNIT PAPER NUMBER

2623

DATE MAILED: 03/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/987,402

Applicant(s)

SAOTOME ET AL.

Examiner

Ashutosh Upreti

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 1-4 and 9-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-8 and 13-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 11/14/01.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-4 and 9-12, drawn to detecting a prospective abnormal shadow in an image at a predetermined detecting level and changing the detecting level according to prior information on the object, classified in class 382, subclass 132.
- II. Claims 5-8 and 13-25, drawn to detecting a prospective abnormal shadow in an image at a predetermined detecting level and changing the detecting level according to the photographing conditions under which the image of the object is taken, classified in class 382, subclass 317.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention II has separate utility such as changing detecting level according to photographing condition. See MPEP § 806.05(d).

Because these inventions are distinct for the reasons given above and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

During a telephone conversation with Tracy Johnson (assistant to Darryl Mexic, Reg. No. 23063) on 02/17/05 a provisional election was made without traverse to

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prosecute the invention of Group II, claims 5-8 and 13-25. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-4 and 9-12 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Specification***

The disclosure is objected to because of the following informalities: On page 1, at lines 14-15, "there has been developed a system" is ungrammatical (changing this to "a system has been developed" would cure this problem). On page 1, at line 16, "once stored" is ungrammatical (changing this to "stored" would cure this problem). On page 2, at line 11, "diagnose" is ungrammatical (changing this to "diagnosis" would cure this problem). On page 2, at line 13, "there has been developed a system" is ungrammatical (changing this to "a system has been developed" would cure this problem).

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 5 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishimitsu (U.S. Patent 5,881,162).

As to claim 5, Ishimitsu discloses changing the detecting level according to photographing conditions (column 12, lines 3-10 and the table in column 12). Here the cut-off frequency used in detection is determined by the grid density and the absence/presence of a grid. Note that usage of a grid is considered to be a type of photographing condition in the applicant's specification.

As to claim 6, Ishimitsu discloses the usage (or the choice not to use) of grids (see table in column 12).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishimitsu as applied to claim 5 above, and further in view of Kanebako (U.S. Patent 5,680,471).

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As to claim 7, Ishimitsu as applied above does not expressly disclose changing the detecting level part by part. Kanebako discloses changing the detecting level part by part (column 11, lines 29-30). Here, an image is divided up into partial areas (Figure 4) and different thresholds (detecting levels) are applied (Figure 6C, left and right thresholds).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to divide up the images of Ishimitsu into partial areas and change the detecting level part by part as in Kanebako, as Kanebako also deals with the processing of x-ray images (column 8, line 62).

One of ordinary skill in the art would have been motivated to do this as it would enable one to achieve more accurate detection results as each threshold used is best suited for its particular area.

Claims 8, 13-20 and 23-25 rejected under 35 U.S.C. 103(a) as being unpatentable over Ishimitsu as applied to claim 5 above, and further in view of Nakajima (U.S. Patent 5,761,334).

As to claim 8, Ishimitsu as applied above does not expressly disclose an image of a mammogram. Nakajima discloses an image of a mammogram (Figure 27A).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use the image processing of Ishimitsu to process images of mammograms as in Nakajima as they both deal with processing medical x-ray images.

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One of ordinary skill in the art would have been motivated to do this, as it would allow the invention to be used in the diagnosis of additional diseases.

As to claim 13, Ishimitsu as applied above, further discloses photographing condition input means (column 12, lines 4-6). Here the operator inputs the photographing condition (grid density in this case). If it is being input, there must inherently be an input means.

Ishimitsu as applied above does not expressly disclose detecting a prospective abnormal shadow according to a detecting level.

Nakajima discloses a prospective abnormal pattern detecting means (column 37, lines 63-64). Thresholds (detecting levels) are used in this detection (column 44, line 7).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use the abnormal pattern detection of Nakajima with the image processing of Ishimitsu as they both deal with processing medical x-ray images.

One of ordinary skill in the art would have been motivated to do this, as it would enable greater accuracy in disease diagnosis.

As to claim 14, the limitations of the claim are rejected for the same reasons as in the rejection of claim 6.

As to claim 15, the limitations regarding changing the detecting level part by part are rejected for the same reasons as in claim 7. The limitations regarding using the detecting level to detect prospective abnormal shadow are rejected for the same reasons as in the rejection of claim 13.

As to claim 16, the limitations of the claim are rejected for the same reasons as in the rejection of claim 8.

As to claim 17, the limitations of the claim are rejected for the same reasons as in the rejection of claim 13.

As to claim 18, the limitations regarding detection processing condition (defined as thresholds etc. in the specification) determination on the basis of photographing condition, the limitations are rejected for the same reasons as in the rejection of claim 5. The limitations regarding detecting prospective abnormal shadows are rejected for the same reasons as in the rejection of claim 13.

As to claim 19, the limitations of the claim are rejected for the same reasons as in the rejection of claim 5.

As to claim 20, Ishimitsu as applied above does not expressly disclose filtering properties of a shape-dependent filter employed in the detection processing. Nakajima



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discloses the use of thresholds (considered a type of filtering property) with a morphology (shape-dependent) filter (column 44, lines 5-7).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use the morphology filter and filtering properties of Nakajima with the image processing of Ishimitsu as they both deal with processing medical x-ray images.

One of ordinary skill in the art would have been motivated to do this, as it would enable greater accuracy in the detection of abnormalities in medical images.

As to claim 23, Ishimitsu as applied above does not expressly disclose one of the photographing conditions defined as either grid kind, tube voltage, the filter, irradiation dosage, pressure on object or object thickness. Nakajima discloses a filter (column 44, line 7) as discussed in claim 20 above.

As to claim 24, the limitations of the claim are rejected for the same reasons as in the rejection of claim 8.

As to claim 25, Ishimitsu as applied above does not expressly disclose that the abnormal shadow is a micro calcification shadow. Nakajima further discloses that the abnormality is a small calcified pattern (figure 27B, P1).

Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Ishimitsu and Nakajima as applied to claim 17 above, and further in view of Sako (U.S. Patent 6,671,394).

As to claim 21, the combination of Ishimitsu and Nakajima as applied above does not expressly disclose predetermined image conversion of a radiation image on the basis of photographing conditions. Sako discloses performing basic gradation processing (considered a form of image conversion) where an input value is fixed to an x-ray irradiation quantity (a type of photographing condition as described in the specification) (column 16, lines 37-39). The limitations regarding prospective abnormal shadow detection are rejected for the same reasons as in the rejection of claim 13.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use the image conversion of Sako with the image processing of the combination of Ishimitsu and Nakajima as they both deal with processing medical x-ray images.

One of ordinary skill in the art would have been motivated to do this, as it would mean the images at the end of the process would be clearer to a user as different photographing conditions would have already been compensated for.

As to claim 22, the combination of Ishimitsu and Nakajima does not expressly disclose image conversion by frequency enhancement. Sako further discloses that an image can be converted using frequency enhancement processing (column 12, lines 51-53).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use the frequency enhancement of Sako to convert the images of the combination of Nakajima and Ishimitsu as they both deal with processing medical x-ray images.

One of ordinary skill in the art would have been motivated to do this, as it would result in clearer images at the end of the process.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ono (U.S. Patent 6,088,425) discloses x-ray imaging for mammography and the use of numerous photographing conditions.

### ***Contact Details***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ashutosh Upreti whose telephone number is (703) 306 4087. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A.U.  
March 4, 2005

  
Jon Chang  
Primary Examiner